

Agricultural Labour

Labour is a indispensable factor of production. No farm production from ploughing to harvesting is possible without labour.

The 2nd Agricultural labour inquiry committee (1956-1957) defined,

"An agricultural labour as one who is employed not only in crop production but also higher employments in other agricultural occupation such as Daily farming, horticultural farming, livestock farming, raising of bee, poultry etc".

Classification of Labour:

A. on the basis of *source* labour can be classified as-

- i. **Family labour-** It include the labour performed by family members of the farmer.
- ii. **Hired labour-** It include the labour performed by other than family member on payment of wages. It can be divided into-
 - Annual labour
 - Seasonal labour
 - Daily labour

B. On the basis of *productivity* labour can be classified as-

- i. **Productive labour-** The labour which is used towards economic activity or creation of utilities is called productive labour.
- ii. **Unproductive labour-** The labour which is used towards non economic activities is called unproductive labour.

C. On the basis of *skill* labour can be classified as-

- i. **Skilled labour-** skilled labour is that labour which required some special training.
- ii. **Unskilled labour-** They do not require any special training.

Factors governing Supply of Labour

In agriculture, supply of labour is determined by the following factor-

1. **Density of rural population-** The thickly populated areas have a large number of labour supply for farm work than areas having low density of population.
2. **Heath-** Health, physical development and deficiency in work influence considerably the total supply of labour.
3. **Wages-** High wages always attract the labour.
4. **Personal interest of labour-** The labour prefer to work of theirs own interest and liking.

5. **Security-** If one job provide more regular employment than others the labour will preference for the farm.
6. **Mobility-** The mobility of labour to seek profitable employment out side their village, will affect the labour supply of village.

Problem of labour

There are many problems of agricultural labour. It's described below -

- 1) **Low standard of living-** The standard of living of labour influence the efficiency. Due to poor wage, the standard of labour is very low.
- 2) **Indebtedness-** Due to seasonal employment in agriculture, the labour incomes is very low. In emergence situation, they borrow money from private agency and One's they have taken loan, they will not able to repay and live long they will be indebted.
- 3) **Force labour-** The agricultural labour are force to work at very low wages.
- 4) **Seasonal employment-** The employment of agricultural labour is highly seasonal due to seasonal nature of agriculture.
- 5) **Irregular hours of work-** The labour have to work for more working hours ranging between 10-12 hours a day.
- 6) **Lack of organization-** Agricultural labour are isolated and unorganized. They do not have their union to strike a better bargain with their employers.
- 7) **Lack of education-** Education is the important factors in the determination of efficiency of agricultural labour. But unfortunately, in our country they are illiterate.
- 8) **Lack of subsidiary occupation-** Due to Lack of subsidiary occupation, the agricultural labour are not getting when their is no work at the farm, they are unemployed in that period.
- 9) **Lack of recreational facilities-** Their is no facility of entertainment to the agricultural labour. Due to lack of recreation, there efficiency is very low.
- 10) **At a risk-** At the time of flood and drought, their is a loss of crop and livestock. To recover loss, they take loan. Thus their financial burden increases.
- 11) **Housing problem-** The housing condition of farmers are pitiable. There is no ventilation in their house. Due to lack of fresh air, most of the times labour becomes ill.
- 12) **Low wages rate-** The wage rate of agricultural labour is very low.

Improvement of Labour Efficiency

1. **Regulation of hours of work-** The labours work for very long hours. These need to be regulated the working hour should not exceed more than 8 hours.
2. **Improvement in the condition of work-** Long hours of work is sanitary condition in agriculture. They are required to be improved.

3. **Fixation of minimum wages-** The wage are very low which are need to be revised in view of raising price & labours needs. Government have to be fixed minimum wages for agricultural labour.
4. **Cheaper transport facilities-** Cheaper transport should be available to the labour So that they may go at a distant place in search for better jobs.
5. **Organization of agricultural labour-** Agricultural labour must be organized and facilities should be provide to form unions for better bargaining with employers.
6. **Protection of women and child labour-** Measures should be taken to ensure protection of women and children employment of in agriculture.
7. **Arrangement of vocational and technical education-** There is need for training program in the rural areas.
8. **Provision of social amenities-** Social amenities like education recreation should be provided to the labour so that they may increase their efficiencies.
9. **Provision of land-** By improving cultivable waste land labour should be provided land to earn their livelihood.

Agro-ecosystem

Ecosystem

No organism or a species live alone, always there are associates influencing each other and organized themselves into communities. The organism of any community besides interacting among themselves always have functional relationship with the external world or environment. This structural and functional systems of communities and their environment is called ecological system, in short the ecosystem-

"Interaction of living organism with environment is known as ecosystem".

Ecosystem Components

There are main 2 components of ecosystem-

1. Living (Biotic component)
2. Non-living (Abiotic component)

1. Biotic component- Autotrops and heterotrops are biotic component of ecosystem. Green plants take simple inorganic materials and produce their own foods, This organism are called autotrops. All other form of life which do not possess chlorophyll can't produce their own foods and depend upon others are known as heterotrops. e.g. Fungi, most of bacteria and animal etc.

2. Abiotic Component- Abiotic component are non living environment are usually of 2 types-

- Materials- like water, mineral salts, atmospheric gases etc.
- Energy- like light, heat, stored energy in chemical bonds etc.

Types of Ecosystem

1. Natural ecosystem

- *Terrestrial ecosystem*- Forest, desert, grassland etc.
- *Aquatic ecosystem*- Fresh water, ponds, river, lake, marine, mangrove ecosystem etc.

2. Artificial Ecosystem- Agro ecosystem, village ecosystem, town ecosystem etc.

Agro ecosystem

Interactive of agriculture and living organism with environment is called agro ecosystem.

Components of Agro ecosystem

Primary producer: Crops and weeds of the field are the primary producer of agro ecosystem. e.g. In a Rice field, there are many producer like durba, mutha, syma etc also present with rice.

Consumer: Among consumer grasshoppers, aphids, bugs, ants, rats, birds, man etc are macro consumer and frog, snake, hawk are micro consumer.

Properties of Agro ecosystem

1. **Productivity**- It is net increment of values products per unit resources (land, labour, energy, capital) and is commonly measured as annual yield /hectare.
2. **Stability**- It is the degree to which, productivity remain constant, inspite of normal small scale fluctuation in environmental variables such as climate or in the economic condition in market.
3. **Sustainability**- It is defined as the ability of the system to maintain its productivity when subject to stress or perturbation. A stress is defined as regular, sometimes continues, relatively small and predictable disturbance. e.g. Affect of growing soil salinity. A perturbation by contrast is an irregular, in frequent relatively long and unpredictable disturbance such as drought or flood or a new pest.
4. **Equitability**- It is a measure of how evenly the produce of Agro ecosystem is distributed among its human beneficial. The more equitable the system, the more evenly are the products to be shared among the population of the farm, village, regions or nation.

Cropping Scheme

Definition

Cropping scheme is a farm budget prepared in advance of a cropping season of the year showing the details farm activities during the proposed year.

Utility

1. To prepared the farm budget for a particular financial year.
2. To predict the expected profit or loss.
3. To prepare the tentative plan of work during proposed year.
4. To determine the total amount quantity of inputs.
5. Input to require and to know in advance.

Importance

1. It indicates the cost of seasonal and varietal cultivation.
2. For proper management of land, labour and capital.
3. It assist in proper functional planning.
4. It assists in calculation of actual net profit.
5. It assists the maintenance of proper farm functions.
6. It assists the preparation of the crop calendar in actual time.
7. It helps in calculating the cultivation and non-cultivation costs.
8. It illustrates the essential elements of a farm.
9. It illustrates the normal and abnormal condition of farm.
10. It allows calculations of the profit or loss of future crops.

Principles of preparation

- 1) Consultation should be made of a map, indicating the farm layout such as roads, ponds, irrigation facilities, number of plots and area etc.
- 2) Varieties of crop should be selected in accordance with local and national requirements.
- 3) Proper crop rotation should be followed for maintaining soil fertility and for controlling pest and disease.
- 4) Green manuring crop should be cultivated for organic matter.
- 5) A particular place should be earmarked for animal husbandry.
- 6) Irrigation and drainage facilities should be checked and made adequate for the cropping scheme.
- 7) Commercial crops should be considered.
- 8) Last years application of fertilizer and its residual effect should be considered.
- 9) A source of capital should be secured.

Multiple Cropping

Definition

Multiple Cropping may be defined as the growing of more than one crop in a year from the same piece of land.

Objectives

1. To increase the cropping intensity.
2. To increase land use intensity.
3. To obtain more crops from the same field in a year.
4. To maximize the use of land and time.
5. To increase the scope of land utilization and diversification of farming.
6. To increase cash income.
7. To cover the risk of low market prices and adverse climate on crops.

Advantage/Importance

- 1) It increases production per unit area.
- 2) It provides a wider variety of crops.
- 3) It increases the farmer's net income.
- 4) It increase the scope of land utilization and diversification of farming.
- 5) It allows better adjustment of planting time of crops.
- 6) It allows better utilization of labour.
- 7) It saves foreign currency expenditure.
- 8) It decreases the food deficit.

Disadvantage/Limitations

- 1) It hampers seed crops production.
- 2) It hampers intercultural operations.
- 3) It decreases nutrient status in soil.
- 4) It creates problem in adapting farm mechanization.
- 5) In some multiple cropping system inter specific competition occur.

Types of multiple Cropping

A. The agronomist Darmopal classified it in the following ways-

- 1) **Mono-culture:** It is the growing of same crop in the same field in a year. e.g. rice after rice, jute after jute.
- 2) **Duo-culture:** 2 types of crops are grown alternately in every year in a piece of land. e.g. Jute after vegetable, Rice after vegetable.
- 3) **Poly-culture:** It is the combination of more than 2 types of crops grown in sequence in a piece of land in a year.

B. Also types as-

- 1) **Pure stand multiple Cropping:** It is a multiple in which the crops are grown successively in a definite period of time of the year in the unit of land, possessed by farmers. In this Practice each crop sown and harvested separately with independent land preparation for each crops. e.g. Aus paddy → T. amon → Lentil.
- 2) **Mixed type of multiple cropping:** It is that kind of multiple cropping in which two or more crops are grown concurrently and mixed together in the same season and in the same piece of land. In mixed cropping one crop is harvested after another depending on their maturity period. E.g. Aus+B. amon, Mustard+lentil, Barley+Rai.
- 3) **Inter-crop type of multiple cropping:** It is a kind of multiple cropping, in which same minor crop are grown in between the space of major crops in alternate pattern. e.g. In between two rows of sugarcane, lentil can be sown.
- 4) **Relay type of multiple cropping:** In this system of multiple cropping, the second or minor crop is sown shortly before the harvest of major crops. e.g. Sowing of seeds of khesari in the field of T. amon, sowing of seeds of water-melon in Rice field.¹

Crop Rotation

Definition

Crop rotation is a process of growing different crop in regular recurrent succession on a piece of land for specific period of time.

Advantage / Importance

There are many Importance both direct and indirect. These are-

¹ [For get advantage or disadvantage of these type of multiple cropping, see "Hand book of Agronomy" by Humayun kabir, page (211-213)].

["Career development in agriculture" book, 27 page for more type of multiple cropping].

1. Maintain soil fertility and productivity.
2. Ensure Economic use of soil resources.
3. Improve soil physical and biological condition.
4. Provide better weeds and insect control.
5. Prevent soil erosion.
6. Economize farm, labour and cost.
7. Provide economic utilization of manure and fertilizer.
8. Systematized the family business.
9. Crop diversification is possible.
10. Ultimately increase the crop yield.

Disadvantage / Limitations

1. Rotation are not always advisable.
2. In case of producing silage, such as maize or sorghum which are very heavy and bulky, it may be advisable to grow this crops on the field near silo pit.
3. Weather condition an other accidents may interfere the rotation.
4. Soil type may be suited for only 1 or 2 crops.
5. Soil topography restricted to grow more than one crop in particular locality.

Planning/Principles of Crop rotation

1. Local demand for the crop is the prime consideration.
2. It should have flexibility to introduce alternate crops under adverse condition.
3. It should include a food crop for consumption by the farmers and a fodder crop for livestock.
4. Smother or cover crop should be included in rotation to control soil.
5. Good rotation should include green manuring crops.
6. Good rotation should include leguminous crop.
7. Good rotation should include profitable cash crop.
8. Good rotation should include one tilled crop for eliminating weeds.
9. Good rotation should include heavily manured crop to increase nutrient status in soil.
10. Deep rooted crop should be followed by shallow rooted crops.
11. Adjustment of the crop should be made according to irrigation facilities.

12. During rotation the land should be kept fallow for one season.
13. Grain crops should be followed by leguminous crops.
14. The suitability of the crop should be taken into consideration.
15. The rotation and feeding system should provide for keeping up the organic matter of the soil.

Crop Diversification

Definition

Crop diversification may be defined as the growing of different crops in a farm or region, either in succession or simultaneously or both together in the course of a year.

Advantage or Importance

1. Biotic environmental balance is maintained to avoid biotic pressure.
2. Judicious crop rotation system are ensured for Agro-ecological Zone.
3. Avoid unbalanced in the biosphere.
4. It helps to malnutrition by supplying balanced diet to the common people.
5. It improves the soil fertility and productivity of the crop.
6. Risk of growing one crop can be overcome.
7. Market demand can be fulfilled.
8. It helps to increase or safe Biodiversity.
9. It helps to control pest and disease.
10. It increases the scope of income.
11. It decrease the risk of crop loss.
12. It helps to achieve self-sufficiency in food grain.
13. It helps to increase cropping intensity.
14. It ensure to develop the agro based industry.
15. It develops the Status of the farmer and national economy.
16. Economy of labour can be maintained.
17. It ensures maximum utilization of time and space.
18. It help to reduce the dependency on other countries.

Present Status of Crop Diversification in Bangladesh

Crop diversification is an old traditional practice in Bangladesh but currently due to introduction of different irrigation facilities to deep tube well, shallow, power pump etc. This traditional crop production practiced have been changed. As a result, the area of rice crop has increased at the cost of diversified crops such as pulses, Oil seeds and other crops. Some present situation regarding crop diversification in Bangladesh are mentioned below-

1. Statistical Information: There is no scope to know the actual position of crop diversification in Bangladesh because the farmers does not keep information about it. Besides this, the government of Bangladesh does not take any conducive step to collect. Such type information only the Bangladesh Buero of Statistics (BBS) collect some relevant information.

In Bangladesh, there are 33.1 lake hectare of double cropped area and 6.6 lake hectare of triple cropped area. (BBS 1980 & BBS 1989).

2. Steps taking by the government: For entire development of the country the government take Crop Diversification Program (CDP). The Ministry of Agriculture (MoA), Canadian International Development Agency (CIDA) and Director General of International Service (DGIS) are involved for establishing this program 4 organization under the MoA e.g.

- Bangladesh Agricultural Research Institute (BARI).
- Bangladesh Agricultural Development Corporation (BADC).
- Department of Agricultural Extension (DAE).
- Department of Agricultural Marketing (DAM).

This organization has played a great role for establishing this project.

3. Crop Identification under Program: Main crop are mustard, lentil, groundnut, gram, sunflower, khesari, mung, potato, sweet potato, soyabean, maize also involved this project. USAID and UNDP help in his project.

4. Transfer Program: All improve technologies are not acceptable to the farmers. It's acceptability depends on new crop, cultivation in farmers farming system, time by utilization of technology and profitability and sustainability of the technology. Technologies in farming system extension under crop diversification are mentioned below-

- | | |
|-----------------------------|--------------------------------------|
| ▪ Cropping pattern. | ▪ Apiculture. |
| ▪ Mixed cropping. | ▪ Block demonstration. |
| ▪ Relay cropping. | ▪ Compost preparation. |
| ▪ Zero/minimum tillage. | ▪ Social forestry. |
| ▪ Fertilizer demonstration. | ▪ School gardening. |
| ▪ Home gardening. | ▪ Seed exchange program. |
| | ▪ Agro technology & family education |

extension program.

- Farms and equipment demonstration.
- Integrated pest management.
- TPS/Potato production technology.

Future Strategy of Crop diversification

1. Kharif season- The maize based or cotton based crop production.
2. Robi season- The jute based or wheat based crop production.
3. Sugarcane land can be brought under inter-cropping totally.
4. As a relay crop khesari/ lentil/ grasspea is included in T. amon field.
5. Short duration and leafy vegetables such as red amaranth, batishak, chinshak etc grown.
6. Different varieties of vegetable crop should be grown in banana, papaya field as inter crop.
7. The high land area requiring vegetable crop, e.g. cauliflower, cabbage, tomato etc.
8. Introduce HYV of different crops among farmers for increasing yield per unit of land.
9. Developed HYV through research.
10. Introduce expensive extension among farmers to develop their situation.
11. Develop suitable technology - Integrated pest management, organic farming etc.
12. Increasing profitable production of minor crops (e.g. pulse) along with major crops.
13. Improvement of suitable technologies on dry, wet and rain fed areas.
14. Improvement of soil fertility through proper soil management.
15. Formulation of Integrated land use policy.
16. Development and dissemination of appropriate transport, storage, marketing etc facilities.

As present there is 84.4 lake hectare of land is under cultivation and total cropped land about 128.4 lake hectare, i.e. 93% of total land.

So, we should grow minimum 3 crops in a year in all high land and medium high land and 2 crops in a year in medium low land. There by, we will get a glorious future by accepting the inter crop technology.

Crop Intensification

Definition

Crop intensification may be defined as growing of crop with intensive care and management by utilizing modern variety and technology to maximize production in a area of land.

Objectives

1. To increase the national income.
2. Maximum use of land.
3. To decrease the insect, pest and disease.
4. To increase the soil fertility and productivity.
5. To increase the employment opportunity.
6. To recover the crop loss for different dormant condition.
7. To increase mixed or inter crop production.
8. To maximum utilization of solar radiation.
9. To increase intensification index by multiple cropping.
10. To ensure food security.

Advantage/Importance

- 1) It increases yield per unit area.
- 2) It increase the national income.
- 3) It helps to Maximum use of land.
- 4) It decrease the insect, pest and disease.
- 5) It increase the soil fertility and productivity.
- 6) It increase the employment opportunity.
- 7) It recover the crop loss for different dormant condition.
- 8) It ensure food security.
- 9) Helps to reduce starvation.
- 10) It helps the emissions of methane from Biomass, cowdung, urine etc.

Disadvantage /Limitations

- 1) Intensive farming hampers environment in many ways.
- 2) Crop Intensification limits or destroy the natural habitat.
- 3) Use of fertilizer in the crop field sometimes harmful for intensified animals.
- 4) Pesticides have to change the crop by destroying both harmful and useful insect.
- 5) It requires large amount of energy, input and transport.

- 6) Use of chemicals- sometimes harmful both crops and animals.

Cropping Pattern

Definition

Cropping pattern may be defined as growing of crops on a land in sequence in a year.

Major cropping pattern in Bangladesh

1. Fallow - T. amon - Boro rice (Irrigated).
2. Aus rice - T. amon - fallow (Rainfed).
3. Aus rice - T. amon - wheat (Rainfed).
4. Jute - T. amon - lentil (Rainfed).
5. Fallow - Mustard - Boro rice (Irrigated).
6. Fallow - Fallow - Boro rice (Irrigated).
7. Vegetable - jute - T. amon.
8. Potato - T. aus - T. amon.
9. Sugarcane -----
10. Banana -----

Factors Influencing Cropping Pattern

A. Climatic Factors

This is the most important factor influencing the cropping pattern. The factors involved are given below-

- **Temperature:** It is one of the most critical factors that influences crop, from when seed is shown up to crop maturity.
- **Rainfall:** Water perform many functions in plants. It dissolves the nutrient in soil which is taken by the root. It promotes turgidity, cell growth and photosynthesis.
- **Day length:** A particular crops requires a definite periods of light and darkness for its growth and development.
- **Humidity:** Different plants required different humidity for their optimum growth and development.

B. Edaphic Factors

As the plant grows on soil, Edaphic factors must be considered. The different factors concerned are-

- **Land elevation:** Particular crops require particular elevation.

- **Soil type:** Most the crops do not grow in sandy soil as its water holding capacity is very low.
- **Soil fertility:** Cropping pattern is designed with consideration to the soil fertility.
- **Soil moisture:** Soil moisture is depend on its water holding capacity and this varies with soil type.
- **Soil P^H:** Some crops grow well in acidic and some in alkaline. Most of the crop prefer neutral soil. It effects on cropping pattern.

C. Neutral Factors

These factor occur naturally which can't be checked by man.

- Flood level
- Suspension material on the flood level.

D. Social Factors

- | | |
|--------------------------------------------|---------------------------------------------|
| ▪ Availability of market. | ▪ Irrigation Facilities |
| ▪ Market Price | ▪ Availability of seeds and other materials |
| ▪ Farmers knowledge and liking | ▪ Density of labour |
| ▪ Growers economic ability | ▪ Credit |
| ▪ Lack of courage and initiative to change | ▪ Working animals |
| ▪ Food habit of the people | |

E. Technological Factors

- | | |
|-----------------------------|-----------------------------------------------------------------------|
| • Limited choice of crops. | • Poor response of bio-fertilizer |
| • Cost and time consuming | • Unavailability of organic manure. Limited scope of land improvement |
| • Limited use of fertilizer | • Lack of technological knowledge. |

F. Geo-social Factors

- | | |
|-----------------------|----------------------------------------|
| • Demand of food crop | • Transport and communication |
| • Food habit | • Custom and tradition |
| • Market system | • Willingness and capability to change |
| • Population density | • Attitude towards materials things |

G. Historical Factors

- | | |
|-----------------------------------------------|------------------------------------|
| • Landlord system | • Farmers proprietary right system |
| • Capital /money /money lending family/ stock | • Nil cultivation |

Possibilities for Improvement The Cultivation Pattern in Bangladesh

There are several possibilities for improving existing cropping patterns in Bangladesh, as it is one of the most suitable areas in the world.

1. It may not be easily possible to bring about profitable change in the cropping pattern during the Kharif season in which the important crops e.g. rice, wheat, sugarcane etc are grown in large areas. But in rabi season which produce crops only 9% of total cropped area has great potential for changing existing cropping patterns.
2. If Irrigated facilities along with financial help, technical knowledge etc are provided to cultivated areas under rabi crops. it will be possible to produce crops economically on a large scale and the cropping pattern will be changed.
3. With increased availability of irrigation facilities, supply of good seeds and fertilizer and plant protection materials and other agricultural implements, the existing cropping pattern can be changed greatly, particularly in rabi season.
4. Full scale implementation of GK project, Tista Barage project, Deep tube well project should supply sufficient irrigation water, and BADC may help the cultivators by timely supplying good seeds, fertilizer, plant protection materials and other physical facilities, so allowing full implements of the plan to expand crop production in the rabi season.
5. In changing crop pattern, Bangladesh Krishi Bank and co-operative bank may gives loan to the farmers.
6. For changing, cropping pattern judicious selection of the crop should be made.
7. Through studies, the accommodation of more sets of crops for triple cropping could be developed, which would changed existing cropping pattern.

OR (SHORT SIZE)

Possibilities of Improving Cropping pattern

1. It is capable of producing a large number of crops due to particular climate and physical condition.
2. If irrigation along with financial help, technical knowledge etc are provided, it will be possible to change cropping pattern.
3. With increase supply of good seeds, fertilizer and agro chemicals existing pattern can be changed.
4. Bank loan will help to improve cropping pattern.
5. Judicious selection of crops existing, pattern may be changed.
6. Double cropping, triple cropping, relay cropping can improve the cropping pattern.

Cropping Calendar

Definition

Crop calendar is the schedule of cultural operation needed in crop production with respect to time.

Objectives

The main objective of a crop calendar is know in advance the timing of cultural Practices of different crops. other objectives are given below-

1. To know actual time of sowing and harvesting of different crops.
2. To facilities for managing money.
3. To assist in proper distribution of labour.
4. To assist in efficient management of crops.
5. To know the actual time for applying fertilizer and pesticides.
6. To record the results of different agricultural practices.

Utility

1. A crop calendar indicates the period /time at which the production Practices of each crop have to be done.
2. It systematized forming and help in efficient farm management.
3. It help the bankers in the distribution of loans to the farmer and realization of the loans from the farmers.

Procedure of Preparation

1. To prepare a crop calendar the production Practices needed for crops are enlisted with respect to time, usually in tabular form under some main heads. e.g. land preparation, sowing/planting time, intercultural operation, harvesting, post harvest operation etc.
2. Convenient of using of time is usually taken as a month.
3. As become time of a particular operations may prolong for different month, it has to be indicated in crop calendar accordingly.

Types of Crop calendar

1. *Tabular crop calendar.*

a. Descriptive

b. Month wise

- Land preparation
- Sowing/transplanting

- Cultural Operation
- Harvesting
- Post harvest operation

2. *Graphical Crop calendar.*

- a. Horizontal
- b. vertical
- c. Circular

3. *pictorial crop calendar*

Crop Reporting

Definition

Crop reporting is the description of the crop in growing stage, mentioning the present condition involving yield status and pest management with comments for improvement.

Objectives

A crop report is made by an investigator to know about the general situation of the existing crop in the field. The following objectives are listed below-

1. To evaluate crop production.
2. To achieve crop forecasting.
3. To compile information with different statistical data.
4. To alleviate the loss from the attack of pests and disease.
5. To determine total production.
6. To facilitate decision making for cropping pattern.
7. Future suggestion for improvement of crops.

Procedure of Crop Reporting

1. The nature of crops should be recorded with the varieties.
2. The total area of the cropping land should be recorded.
3. The age and development of crops should be recorded.
4. Crop condition such as vigour, growth and infection by pests or disease should be recorded.
5. Future outline of crop pattern should be formulated etc.

Crop Forecasting

Definition

By crop forecasting we mean estimate or predicting the yield of certain crop during its growth period and sufficiently ahead of the time of its harvest.

Objectives

1. To help the government of fix the price of different commodities.
2. To know the actual situation of crop production.
3. To make a future plan.
4. To help the farmer/government to store appropriate quantities of produce.
5. To decided whether food will imported or exported of assessing of the crop.

Advantage / Importance

1. It helps to the government to decide whether food will be exported or imported on assessing the condition of the crop.
2. It helps the government to fix the price of different agricultural commodities.
3. It helps the government to store appropriate quantities of produce.
4. 4. It helps the government to take necessary action, if damage to crops is caused by natural calamities.
5. An proper yield forecasting gives farmers the advance of beneficial marketing planes for their products.
6. It is important in providing timely information for optimum management practices of growing crops.

Methods of crop yield forecasting

3 methods are currently being developed and applied for crop yield forecasting

1) The field measurement and analysis of the standing crops.

2) The application of Remote sensing technologies-

- Empirical regression model
- Bio-mass production model
- Stress degrada

3) The use of Crop model-

- Statistic regression model.
- Physiologically based comprehensive process model.
- Simplify process model

Crop Cutting Experiment

Definition

A crop cutting experiment is a procedure of determining the yield of a crop of an area.

Objectives

1. It is done for determining the yield of cropped area which represent the simple yield of that particular year of the particular crop of the entire area.
2. By crop cutting experiment, the government is able to estimate whether there will be shortage or surplus in a particular year.
3. It helps the government to determine whether a particular crop has to be imported or exported for the benefit of the country.

Crop Yield Estimation

Yield

The total dry matter produced by a crop is known as biological yield and a fraction of the biological yield which is useful for human is known as economic yield.

Yield Estimation of Field Crops

Yield estimation of various crops have been attempt with the use of yield components. Yield cost of Rice crop are as follows-

01. RICE

What would be the yield of rice grains, if the average panicle density/m²- 260, No. of field grains/panicle- 136, Test weight- 20g. Estimate the yield of rice?

Solution

Yield of rice (ton/ha)= (10,000 X No. of panicle/m² X No. of grains/panicle X Test weight) ÷ (1000 X 1000 X 100 X 10).

= (10,000 X 260 X 136 X 20) ÷ (1000 X 1000 X 100 X 10).

= 7.072 ton/ha.

02. WHEAT

Yield Estimation of wheat grain and straw from following information-

- Spacing- 20cm X 3cm.
- No. of effective tilles/plant.

- No. of grains/panicle- 32.
- Test weight- 40 g.
- grain:straw- 1:1.5

Solution

$$\text{Spacing} = 20 \times 3 \text{ cm}^2 = 0.2 \times 0.03 \text{ m}^2 = 0.006 \text{ m}^2$$

0.006 m² place have 1 till

$$= 1 \text{ m}^2 \text{ place have } (1 \div 0.006) \text{ till} = 500 \text{ tills.}$$

Yield of wheat grain = (10,000 X No. Effective tills/m² X No. of grains/panicle X test weight) ÷ (1000 X 1000 X 100 X 10).

$$= (10,000 \times 500 \times 32 \times 40) \div (1000 \times 1000 \times 100 \times 10).$$

$$= 6.4 \text{ ton/ha.}$$

Yield of wheat straw = (6.4 X 1.5) = 9.6 ton/ha. [given that- grain: straw = 1:1.5].

03. MAIZE

Yield Estimation of maize from following information-

- Spacing- 75cm X 30cm = 0.75 X 0.3 m² = 0.225 m².
- No. of cobs-2.
- No. of grains row/cob-10.
- No. of seeds/grain row- 25.
- Test weight- 200 g.

Solution

Yield of maize = (10,000 X cobs/plant X grains row/cob X No. of seeds/grain row X test weight) ÷ (1000 X 1000 X 100 X 10 X spacing/m²).

$$= (10,000 \times 2 \times 10 \times 25 \times 200 \text{ g}) \div (1000 \times 1000 \times 100 \times 10 \times 0.225).$$

$$= 4.44 \text{ ton/ha.}$$

04. SUGARCANE

Yield Estimation of sugarcane from following information-

- No. of millable cane/clump- 15.
- spacing of clump- 90 X 60 cm² = 0.54 m².

- Weight of cane- 600 g.

Solution

Yield of Sugarcane= (10,000 X No. of millabl cane/clump X Weight of cane) ÷ (spacing/m² X 1000 X 100 X 10)

= (10,000 X 600 X 15) ÷ (0.54 m² X 1000 X 100 X 10).

= 166.66 ton/ha.

05. JUTE FIBRE

Yield Estimation of Jute fibre from following information-

- spacing of clump- 25 X 10 cm²= 0.025 m².
- Weight of matured plant- 65 g.
- Extractable fibre/percent- 7.5%.

Solution

Yield of Jute fibre= (10,000 X Weight of matured plant X Extractable fibre/percent) ÷ (spacing X 1000 X 100 X 10).

= (10,000 X 7.5 X 65) ÷ (0.025 X 1000 X 100 X 100).

= 19.5 Quintal/ha.

Mahbubul Alam.

Crop Science & Technology [6th Batch].

University of Rajshahi.

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